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| **Lesson Title:** The Egg Drop Project: Experimenting with Engineering, Technology and Inquiry |
| **Subject area / course / grade level:** Science / Engineering and Technology / 5th Grade |
| **Introduction:** Teacher **will** hold an egg (in a sealed bag) above their head and ask the students to predict what would happen if the egg was dropped-teacher drops egg-students give explanations as to why the egg broke. |
| **Lesson Length:** 2 class periods-90 minutes collectively. |
| **Materials:** Day 1-Egg and Ziploc bag used in Introduction. Paper, pencils and coloring pencils or markers at desks for group collaboration and inquiry. At home: Various objects with which to construct the EPM, a raw egg |
| **Lesson Overview:** Day 1 –**Introduction, Review and Collaboration**. Students will review standards related to energy and motion. Students will engage in group discussions during which they will collaborate and utilize the skills of inquiry, engineering and technology. Students will be assigned the task of designing an object that will protect a raw egg from breaking when dropped from 50 feet. The mechanism they design will be henceforth referred to as “The Egg Protection Mechanism” (EPM) Students must turn in a graphic representation of their EPM. On the graphic resource, students should write a paragraph explaining their graphic representation and their prediction as to exactly HOW its design will protect the egg. Day 2-Egg Drop Day. Students will have their EPM dropped from 50 feet (each EPM should have, encased within its structure, a raw egg provided by student), After EPM is dropped, students will then observe and document their results to compare with the prediction they documented on the graphic representation. If the project failed, students will cite the reason why they think it failed and will write a plan for improving the EPM. If it was a success, students document same and explain the specific characteristic to which they attribute its success. |
| **Tennessee Standards:** This lesson will address the **embedded standards of ,engineering, technology and inquiry**. It will also address **Standard 10 Energy** **s.p.i. 507.10**.1-Differentiate between potential and kinetic energy. **Standard 11 Motion s.p.i. 507.12.2** Identify the force that causes objects to fall to earth (gravity) **s.p.i. 507.12.3**-Use data to determine how shape affects the rate at which a material falls to earth. |
| **Lesson objective(s):** Students will utilize the skills of collaboration, engineering, technology and inquiry to construct a device that should encase and protect a raw egg that will be dropped from a height of 50 feet. This lesson will enable students to utilize prior knowledge (previously taught objectives) relating to energy (potential and kinetic), the force of gravity, and analysis of data to determine how the shape of their EPM affects the rate at which a material falls to earth. |
| **ENGAGEMENT**  Students will be engaged;  ~ by the introduction as they are “drawn in” by the initial demonstration of the teacher dropping the egg.  ~with their peers as they collaborate to brainstorm ideas for the construction of a device that would protect an egg dropped from 50 feet.  ~ in “hands-on” learning as they put their ideas on paper by drawing a “blue print” for their EDM.  ~ in “hands-on” learning during the actual construction of their own EDM.  ~by assimilating and analyzing data |
| **EXPLORATION**  ~Students will explore with their peers by engaging in group discussions during which they will collaborate and utilize the skills of inquiry, engineering and technology to brainstorm the possible designs for a device that can protect a raw egg dropped from 50 feet.  ~Students will explore as they experiment with various designs and materials suitable to construct a device capable of protecting a raw egg when dropped from 50 feet. |
| **EXPLANATION**  Students will give a detailed explanation of their design by drawing a blueprint of their EPM. If the project fails, students will cite their explanation as to why they think it failed and will write a plan for improving the EPM. If it was a success, students will explain the specific characteristic to which they attribute its success. I |
| **ELABORATION**  Students will have hands-on experience in the construction of a device intended to solve a problem. They utilize the knowledge and experience acquired in this project for future problem solving skills. They will also be able to see how drawing a blueprint, constructing a device, experimenting with a device, and analysis of the device can be useful in MANY areas of their life. |
| **EVALUATION**  The students will engage in self evaluation as they analyze data at the conclusion of the project. I will evaluate their performance by observing their blueprint, watching the EPM as it is dropped, evaluating the effectiveness of same by checking to see if it did, in fact, protect the egg, and I will grade their data analysis and their self evaluation of their project. |